

What is claimed is:

1. A method of processing a semiconductor wafer having a large number of rectangular areas sectioned by streets arranged in a lattice form on the front surface, circuits being
5 formed in the respective areas, comprising:

the mounting step of mounting the semiconductor wafer on a protective substrate in such a manner that the front surface of the semiconductor wafer is opposed to one side of a protective substrate having a large number of pores in at
10 least its central area;

the grinding step of holding the protective substrate mounting the semiconductor wafer on a chuck means for grinding and grinding the exposed back surface of the semiconductor wafer with a grinding means;

- 15 the transfer step of removing the protective substrate off from the chuck means for grinding, then affixing the back surface of the semiconductor wafer mounted on the protective substrate removed off from the chuck means for grinding on a holding means, and thereafter, removing the protective
20 substrate off from the front surface of the semiconductor wafer; and

the cutting step of holding the holding means mounting the semiconductor wafer on a chuck means for cutting and applying a cutting means to the exposed front surface of the
25 semiconductor wafer to cut the semiconductor wafer along the streets.

2. The method of processing a semiconductor wafer according to claim 1, wherein the holding means is constituted by a
30 mounting frame having a mounting opening at the center and a mounting tape affixed to the mounting frame in such a manner that it strides over the mounting opening, and, in the transfer step, the back surface of the semiconductor wafer mounted on the protective substrate removed off from the chuck means for

grinding is affixed to the mounting tape in the mounting opening of the mounting frame in order to mount the semiconductor wafer on the holding means.

5 3. The method of processing a semiconductor wafer according to claim 1, wherein in the mounting step, a resin solution is coated onto the front surface of the semiconductor wafer, a solvent is evaporated before or after the front surface of the semiconductor wafer is caused to be opposed to one side of the
10 protective substrate in order to form a resin film having adhesion, and the semiconductor wafer is mounted on the protective substrate via the resin film.

4. The method of processing a semiconductor wafer according to claim 3, wherein the resin solution is applied to the front
15 surface of the semiconductor wafer by supplying resin solution droplets onto the front surface of the semiconductor wafer and rotating the semiconductor wafer at a revolution of 10 to 3,000 rpm.

20 5. The method of processing a semiconductor wafer according to claim 3, wherein the resin film has a thickness of 1 to 100 μm .

25 6. The method of processing a semiconductor wafer according to claim 3, wherein in the transfer step, prior to the removal of the protective substrate from the front surface of the semiconductor wafer, a solvent is supplied to the resin film through the pores of the protective substrate to dissolve the
30 resin film.

7. The method of processing a semiconductor wafer according to claim 6, wherein the resin solution is water-soluble, and the solvent is water.

8. The method of processing a semiconductor wafer according to claim 1, wherein in the mounting step, the front surface of the semiconductor wafer is adhered to the one side of the protective substrate by an adhesive double-coated tape.

9. The method of processing a semiconductor wafer according to claim 1, wherein in the mounting step, the front surface of the semiconductor wafer and the one side of the protective substrate are contact bonded together via water.

10. The method of processing a semiconductor wafer according to claim 9, wherein prior to contact bonding the front surface of the semiconductor wafer to the one side of the protective substrate through water, a protective resin tape is affixed to the front surface of the semiconductor wafer.

11. The method of processing a semiconductor wafer according to claim 9, wherein in the transfer step, the protective substrate is heated to evaporate water existing between the front surface of the semiconductor wafer and the protective substrate.

12. The method of processing a semiconductor wafer according to claim 1, wherein in the transfer step, prior to the affixing of the back surface of the semiconductor wafer to the mounting means, a die attach film is affixed to the back surface of the semiconductor wafer.

13. The method of processing a semiconductor wafer according to claim 1, wherein the protective substrate has a frame area surrounding the central area, pores are not formed in the frame area, and the semiconductor wafer is mounted within the central area of the protective substrate.

14. The method of processing a semiconductor wafer according to claim 13, wherein the area ratio of the pores to the central area of the protective substrate is 1 to 50 %, and the pores
5 have a diameter of 0.1 to 1.0 mm.

15. The method of processing a semiconductor wafer according to claim 13, wherein the protective substrate is formed of a sheet metal having a thickness of 0.1 to 1.0 mm.

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